Commercial Space Transportation Advisory Committee
May 23, 2002
MEETING MINUTES

COMSTAC Chair, Livingston Holder, convened the meeting at 8:14 a.m., and welcomed COMSTAC members and guests. He announced that the next COMSTAC meeting would be held on October 31, 2002. Next, he introduced three new Committee members, appointed by Secretary of Transportation, Norman Y. Mineta, on April 9, 2002: James Pagliasotti, president of JMP Associates, Littleton Colorado; William W. Pickavance, Jr., vice president and deputy manager for Florida Operations for United Space Alliance; and Hamet A. Watt, chairman and founder of OrderByTV, Inc., Arlington, Virginia. Chairman Holder noted that Mr. Watt was appointed to serve on COMSTAC as the "under-30" representative, a category established by the Associate Administrator for Commercial Space Transportation (AST) to help introduce a new generation of representatives to the U.S. commercial space transportation industry. Chairman Holder next recognized COMSTAC member Robert S. Cowls and his recent retirement from The Boeing Company. He acknowledged Mr. Cowls' work on the Committee since 1996, especially as the Chair of the Risk Management and Technology and Innovation working groups. Chairman Holder challenged the audience " . . . to focus on the growing need to keep the U.S. commercial launch industry vital and strong and to think of ways we can work together to achieve success for the industry." He stated that the Committee would be focusing on this and looking at ways to coordinate and collaborate with NASA on the Space Launch Initiative. He also urged industry representatives to take advantage of the unique industry/government relationship that the COMSTAC provides.

Remarks by Federal Aviation Administrator (FAA) Jane F. Garvey

FAA Administrator Jane Garvey presented remarks to the Committee and meeting attendees. She emphasized the successes achieved by the U.S. commercial space transportation industry especially with initiatives such as the Sea Launch venture. She also recognized the achievements of AST over the last five years, emphasizing AST's progress in regulation development and increasing office resources both for budget and personnel. Ms. Garvey, along with Patricia G. Smith, Associate Administrator for Commercial Space Transportation, presented a plaque to Bob Cowls to acknowledge his work and his long-time membership on the COMSTAC. Mr. Holder next presented Ms. Garvey with a plaque to commemorate her work as FAA Administrator and the upcoming end to her term in August.

Report on AST Activities

Joseph A. Hawkins, Deputy Associate Administrator for Commercial Space Transportation (AST) reported that, although there was a significant downturn for the industry in 2001 (only 6 commercial launches), industry activities were now gaining momentum with an increase in orders for U.S.-built satellites and the upcoming launch of the Atlas V evolved expendable launch vehicle (EELV) later in the year. Mr. Hawkins highlighted important AST accomplishments, including the February 2002 Commercial Space Transportation Forecast Conference and the timely completion and submission of the report ***Liability Risk-Sharing Regime for U.S. Commercial Space Transportation.***

He also reported that the Supplemental Notice of Proposed Rulemaking was in final coordination. Mr. Hawkins noted that AST has been examining the area of launch security since the September 11th attacks and AST staff member, Amy Snyder, developed a paper entitled ***Space Security: an Issue of Global Concern***, which Associate Administrator Smith planned to present at the International Symposium on Space Technology and Science in Japan in June. He also reported on AST's work in developing a safety approval process for reusable launch vehicle (RLV) operations and the subsequent series of tabletop exercises, which several companies participated in to test the process.

NSC/OSTP Policy Development Activities

Brett Alexander, Senior Policy Analyst, Technology Division, White House Office of Science and Technology Policy (OSTP), updated the Committee on the status of the Space Policy Coordinating Committee (Space PCC). He noted that the three agencies most involved in space policy for the current administration are the National Security Council (NSC), OSTP, and the Office of Management and Budget (OMB). He stated that the NSC organizational structure that was set up by National Security Policy Directive 1, on February 13, 2001, consisted of over 20 PCCs to handle the day-to-day issues and interagency coordination for national security policy. He added that the PCCs are categorized by region or functional topics such as the Space PCC and replace the system of interagency working groups.

Mr. Alexander next discussed the make-up and functions of the Space PCC, stating that the PCC is chaired by the NSC Senior Director for Defense Policy and Arms Control, and fulfills the recommendation for a senior-level interagency group on space (SIGspace) policy set forth by the Rumsfeld National Security Space Commission report. He noted that the PCC included executive office membership from OSTP and OMB with senior-level representatives from the Departments of State, Defense (including Air Force), Commerce, and Transportation (including FAA) and representation from NASA and the intelligence community. He listed the major issues covered in the first year of the PCC, including:

- **Export Controls**
  - The resolution of the space-qualified components issue
  - Publication of the ITAR exemption for universities in the Federal Register
  - A proposal to transfer licensing authority back to Department of Commerce
- **International Space Cooperation**
  - The development of civil and commercial cooperation with India
  - The development of civil and commercial cooperation with China if proliferation issues can be worked out
- **Space Transportation and Remote Sensing**
  - The revision of space policy focusing on those two areas to be signed off by current Administration
  - The devising of a method of gathering industry input

COMSTAC member, Lou Gomez, commented that the Air Force and NASA were conducting a joint 120-day study regarding RLVs, for the purpose of sorting out

requirements for an RLV system that would satisfy both agencies. Mr. Gomez inquired as to whether those requirements were being factored into OSTP policy? Mr. Alexander responded that one of the conclusions from that joint study was that there will probably be significant overlaps between the requirements for the civil sector and the national security sector, although not necessarily one launch vehicle built to common requirements. He stated that there will probably be joint activities on technology development, which could lead to several possibilities, i.e., one vehicle or a family of vehicles, and added that the Air Force is examining its requirements and NASA has earmarked a funding wedge of about $5 billion for 5 years (to 2006) and is very open to cooperating with the Air Force.

FAA Study on Liability and Risk Sharing

Esta Rosenberg, legal counsel in FAA's Office of Chief Counsel, discussed the report, ***Liability Risk-Sharing Regime for U.S. Commercial Space Transportation***, which was required by Congress in the Commercial Space Transportation Competitiveness Act of 2000. She reported that the report was delivered to Congress at the end of April.

Ms. Rosenberg stated that Congress directed the FAA 1) to analyze the adequacy, propriety, and effectiveness of, and need for the existing regime in the U.S. 2) to examine the current liability and risk-sharing regimes in other countries which space transportation capabilities; 3) to look at the appropriateness of deeming space transportation activities as ultra-hazardous, therefore subject to a strict liability standard and also to examine which liability regime should be attached to space transportation activities, whether ultrahazardous or not; 4) to examine the effective relevant treaties on international obligations of the United States and see how the current regime satisfies those obligations; 5) to look at the appropriateness of transitioning RLVs to an airline type liability regime as RLVs mature; 6) to examine the need for changes to the Federal Government's indemnification policy to accommodate the risks associated with commercial spaceport operations; and 7) to examine recommended modifications for consideration by Congress.

She noted that data and information were gathered through:

- review of the Commercial Space Launch Act, FAA commercial space transportation regulations, legislative history and history of congressional hearings, law review articles, studies, and economic analyses;
- one public meeting in April 2001 and two virtual public meetings;
- the October 2001 COMSTAC report on liability and financial responsibility prepared by the Risk Management working group;
- consultations with other Federal agencies, including the Departments of State, Justice, Treasury, and Commerce (Office of Space Commercialization), the Federal Communications Commission, and the Nuclear Regulatory Commission; consultations with insurance brokers and underwriters; and
- consultations with foreign launch providers.

Ms. Rosenberg summarized the findings for the seven issues:

1) The current regime is adequate based on customer acceptance;

2) Many of the countries with space transportation capabilities have modeled their liability and risk sharing regimes on the U.S. and are more advantageous than the U.S. program, e.g., most don't have sunset provisions;
3) It is not appropriate to deem space launch activity as ultrahazardous since it could cause higher insurance premiums and insurer withdrawal;
4) The current regime affords the U.S. Government and the taxpayer financial protection in meeting certain treaty obligations up to the maximum probable loss (MPL) amount;
5) It is premature to offer recommendations on transitioning the risk-sharing regime for RLVs to that of the airline industry;
6) Launch and reentry-related risks occurring at commercial spaceports are covered by the current regime; and
7) Recommendations for modifications to the existing regime include one option for alternatives to the current regime and a second option for modifications to the current regime.

    a. Alternatives to the current regime include:
        - Trust funds
        - Self-insurance
        - Captive or pooled insurance
        - Catastrophe bonds
        - Subsidized insurance or tax subsidies

    b. Modifications to the current regime include:
        - Maintain MPL requirements, but eliminate indemnification
        - Revise MPL-based requirements
        - Provide the maximum amount of available insurance at a reasonable cost
        - Limit indemnification to $1 billion, but eliminate the sunset provision
        - Eliminate indemnification and MPL requirements

Ms. Rosenberg explained that in order to evaluate the merits of each option, five goals were identified: 1) maintaining adequate insurance capacity, 2) supporting international competitiveness for the industry, 3) maintaining the certainty and stability of the current regime, 4) maintaining a viable and robust industry and 5) establishing full cost internalization by the parties that cause the risk

COMSTAC alternate, Chris DeMars, asked why the option of self-insurance was a good option. Ms. Rosenberg explained that if the self-insurance pool is adequate, then there should be full coverage for liability. COMSTAC alternate, Elaine David, expressed appreciation to Ms. Rosenberg and AST for outstanding work on the report and recommended that the Risk Management working group review the report and report back to the Committee at the October 2002 meeting. Chairman Holder and Deputy Chair, John Vinter agreed. COMSTAC member, Eleanor Aldridge also recommended that the full

Committee focus on additional recommendations concerning the sunset provision for indemnification.

GSO Forecast Report

Doug Howe, manager, Strategic Market Assessment, The Boeing Company, presented the ***2002 COMSTAC Commercial Geosynchronous Orbit Launch Demand Model.*** He reported that the forecast covers the years 2002 to 2011 and that the average annual demand is down approximately 11 % from the previous year in terms of satellites (27.3 satellites per year vs. 30.5 for last year) and 15% lower in terms of launches (20.5 launches per year vs. 24.1 for last year) adding that it does not return to previous levels until 2008. He added that the forecasted growth in terms of spacecraft mass basically remains unchanged with the two heaviest mass classes accounting for about 56 percent of the forecast and a change in the mass categories to better reflect satellite busses being sold on the market today.

He reported that the survey was sent to approximately 100 organizations, and 27 responses were received from spacecraft manufacturers, launch service providers, and satellite service providers, both international and domestic. He said that the working group looked at addressable commercial payloads only, i.e., those that are internationally competed and open to U.S. launch providers, excluding national payloads, i.e., military, civil, and science. He explained the two-part methodology of the forecast, noting that the near-term forecast that covers the first three years (2002-2004), is a bottoms up forecast based on manifests of launch service providers; and a long-term forecast covering the last seven years of the period (2005-2011) which is actually the average of the comprehensive domestic inputs from four companies. He noted that this is a forecast of demand and not a forecast of the actual number of satellites expected to be launched. He concluded that the 2002 forecast of 32 satellites to be launched shows that only 14 were launched in 2001 and satellite demand and launches are being impacted by economic conditions, availability of financing, and factors such as industry consolidation.

COMSTAC member Lou Gomez asked if terrestrial links had impacted satellite demand and Mr. Howe responded that it has caused an impact. COMSTAC member, John Logsdon asked why the demand of 32 satellites could not be met and Mr. Howe responded that it can be met if satellites arrive on time for launch and/or if there are no failures. Chairman Holder added that the GSO report is designed to show what the market needs and not necessarily to predict what will happen. COMSTAC member Alex Liang also added that the report is a depiction of the business opportunities available. COMSTAC alternate Elaine David asked whether the newly-proposed European Alphabus was considered in the report and Mr. Howe said that larger bus designs were considered, though not specifically the Alphabus. COMSTAC member, Billie Reed raised the issue of whether the COMSTAC could examine the cause and effect of the capture rates for market share which are in the GSO report to ensure that the Committee provides the best information and business advice to FAA/AST. Chairman Holder agreed that this would be a good task for the Technology and Innovation working group. Chairman Holder called for a vote and the report was adopted by the Committee.

Non-Geosynchronous Orbits (NGSO) Forecast Report

John Sloan, senior policy analyst in AST's Space Systems Development Division, provided the briefing on FAA's ***2002 Commercial Space Transportation Forecast for Non-Geosynchronous Orbits***. Mr. Sloan reported that in spite of bankruptcies, the companies that have launched, such as Iridium, GlobalStar, ORBCOMM, or are trying to get into orbit, are still operating and serving customers. Some are still planning follow-on systems, and none are giving up licensed spectrum granted by the FCC. He noted that, in the current environment, it is difficult to assess the market for broadband satellites and that the NGSO forecast uses payloads that are open to internationally competed launch services procurement and other commercially sponsored payloads, like the GSO forecast. He also reported that secondary payloads were used in this year's forecast. He reported on the following projections:

Baseline Payload Forecast: 79 payloads for 2002-2011 (48% lower than the 151 projected in the 2001 forecast). This includes 34 international science and other satellites; 20 remote sensing satellites, and 25 telecommunications satellites.

Baseline Launch Forecast: 63 total launches for 2002-2011 (21% lower than 80 launches projected in 2001 forecast). This is an average of 6.3 launches per year including 2 medium-heavy vehicles and 4 small launch vehicles. By sector, this includes 33 science payloads; 16 remote sensing satellites; and 14 telecommunications satellites.

Robust Payload Forecast: 132 payloads for 2002-2011 (21% lower than the 168 payloads projected in 2001). By sector, this includes 1 broadband system; no big LEOs; 1 little LEO system; 6 more international science payloads; and 3 more remote sensing satellites.

Robust Launch Forecast: 84 total launches for 2002-2011 (21% lower than the 104 projected in 2001). This includes 19 more launches, 1 medium-heavy launch vehicle added for an average of 4 per year; and 1 small launch vehicle added for an average of 5 per year.

Mr. Sloan pointed out several trends:

- The market has shifted away from telecommunications to science/other payloads and remote sensing satellites;
- The emergence of the broadband market is still uncertain;
- There are more companies with smaller payloads (25-50 kilograms) turning to Russian launch providers because there is no U.S. provider for this niche;
- Digital audio radio is popular, including such systems as XM and Sirius and two new European proposals; and
- The financial conditions for new ventures have not improved compared to last year.

He concluded that conditions can improve if there is a stronger U.S. and international economy, if investors' confidence can be increased; if the FCC makes a positive determination on the ground repeaters issues, and if there is a clear success in the broadband market.

COMSTAC member Michael Kelly asked if the two Russian Soyuz launches which included passengers, Dennis Tito and Mark Shuttlesworth, were included in the projection. Mr. Sloan replied that they were not since those launches did not constitute a commercially-generated launch. Mr. Kelly commented that, in the future, such launches should be included since they generate revenue and increase investors' interest.

EELV Updates

Delta IV (The Boeing Company)

Jay Witzling, vice president and general manager for the Delta Program, and Dan Marin, both from The Boeing Company, provided an update on the Delta IV program. Mr. Marin reported that the inaugural launch, scheduled for August 2002, will be on the Delta IV (2) with a Eutelsat payload. He also reported that the hardware for Boeing's first Air Force launch is being completed for a launch in October 2002.

Mr. Marin reported on several other Delta IV milestones, including the certification of the engine; the construction of the Decatur factory for raw materials and producing boosters; the complete qualification of the upper stage; modification of SLC-6 at Vandenberg for the 2003 launch; the completion of the Delta IV launch site construction at Cape Canaveral; and the completion of the expansion of Building 9 by Astrotech for the Delta IV five meter fairing. He noted that all system level testing is complete and the first flight vehicle has been delivered and is currently in the process of being checked out.

Atlas V (Lockheed Martin Corporation

Alison Fortier, vice president of Space and Strategic Programs, Washington Operations, Lockheed Martin Corporation, reported on the status of the Atlas V program. She noted that the EELV program has taken a low-risk approach designed to reduce manhours and, in turn, reduce costs. She noted that specifically for the Atlas V, reliability has been increased, and costs to the U.S. Government have been reduced using a common element approach with the same components, e.g., the same Russian RD-180 booster, a common core, a common Centaur, and two payload fairings depending on the size of the payload and the size of the vehicle.

Ms. Fortier reported that Lockheed Martin had completed approximately 30,000 seconds of hot fire on forty-four RD-180 engines with testing at both Ergomash in Russia and at the Marshall Space Flight Center in Huntsville, Alabama. She also reported that the Atlas V uses a "clean pad concept" and requires only three facilities to process compared with the Titan, which used more than 18 facilities. She noted that in addition to the upcoming launch in August, the Atlas V is scheduled for seven U.S. Government launches, with the first scheduled for 2005.

COMSTAC member John Logsdon asked for industry's opinion on how the government could help U.S. launch providers in the international market with Arianespace cutting prices and other foreign launch providers planning to enter the market? One response was that the government could continue to invest in range modernization.

GPS Metric Tracking

Dan Salvano, FAA's director of Communication, Navigation, and Surveillance Systems, presented a briefing entitled ***Commercial Space Transport Tracking: Potential ADS-B Tracking Capabilities.*** The purpose of this briefing was to present the capabilities for Automatic Dependent Surveillance-Broadcast (ADS-B) to support tracking of commercial space transportation launch vehicles. He explained that ADS-B must have three elements to deliver a service: avionics, (the aircraft must be equipped to send and receive ADS-B messages); infrastructure, (the ground receivers must be installed to receive ADS-B messages); and automation integration, (the air traffic automation systems must be modified to take advantage of ADS-B surveillance information). He noted that the ADS-B message includes the aircraft's heading, altitude, intent (where it intends to go), call sign, speed, distance, and category.

He provided some examples of the current integration of the ADS-B system, including the Alaska Capstone program, the current usage of the system in Alaska, Memphis, and Louisville, Kentucky, and a comparison of the ADS-B system to traditional radar. He also reported that the FAA is working on the development of international standards for ADS-B avionics certification. He reported that the use of the ADS-B system would improve the quality and efficiency of air traffic control so that the pilot and the controller would have a better picture of what is taking place in flight. Mr. Salvano concluded that the ADS-B system is being implemented worldwide; the ADS-B avionics, infrastructure, integration, standards, and coverage are maturing and increasing; the technology is capable of supporting a wide variety of requirements; and that high update rates and accuracy should be able to support the high speed flight profile of commercial space launch vehicles.

Pradipta Shome, project engineer in AST's Systems Engineering and Training Division, discussed ***GPS Metric Tracking for Range Safety***. Mr. Shome discussed the advantages of using the Global Positioning Satellite (GPS) system for tracking launch vehicles, noting that GPS is a critical element of range modernization because it has increased accuracy, it can be used for over-the-horizon tracking, and the infrastructure is already in place. He added that it can be used for further improvements, including autonomous flight termination systems, increased accuracy, and differential grade accuracy. He also noted several disadvantages, including life-cycle costs and system vulnerabilities. Mr. Shome noted that high range costs, aging radar infrastructure, the need for global, wide bandwidth telecommunication infrastructure for data transfer, and the need for different tracking technology for RLVs are some of the current issues associated with GPS tracking.

COMSTAC member Alex Liang expressed his opinion that recurring costs for GPS tracking are sufficiently low and that accuracy is also not an issue.

WORKING GROUP REPORTS

Risk Management Working Group (RMWG)

John Vinter, president and CEO of International Space Brokers, Inc. and chair of the RMWG, reported on the status of the insurance industry, noting several important factors, including the emergence of new launchers; bigger and better satellites coming on line, emerging generic problems, more privatization, more consolidation and mergers, and higher rates as a result of September 11th. He reported specifically on first-party coverage and noted that approximately 70% of the world's underwriting capacity is outside the U.S. He discussed the market from 1995, noting that from 1995 through 1997, insurance underwriters made significant profits, the insurance cycle was considered normal, and 1998 was a peak for the market. He explained, however, that in 1999, the loss of the Orion satellite dramatically increased rates and this situation worsened with losses in 2000. He added that the situation worsened even more in 2001 due to four additional failures (Artemis Ariane launch failure, PanAmSat solar array failure, Orbview launch failure, and Arabsat solar array failure) and finally the September 11th attack, which has impacted most insurance.

Mr. Vinter concluded by noting the conditions in the 2002 market, including upward pressure on rates, lower capacity, tighter underwriting/technical requirements, trend away from multi-year launch (3 and 5 years) period in favor of launch +1 year policy, and continued US Government mandated ITAR compliance issues.

COMSTAC member, Janet Sadler, continued the briefing, reporting on the conditions of third-party coverage and discussing the September 11th impacts on the market after almost a year. She mentioned that space-related liabilities are underwritten by the larger aviation market and therefore, the space market follows the trends of the aviation market. She reported that the third-party market is experiencing reduction in available capacity, increased premium costs, and contraction to policy limits and coverage. She added however, that although capacity is reduced, there is still adequate capacity available; that increased premium costs will eventually decrease, normal insurance cycles would return; insurers are now reevaluating their catastrophe exposure, and upper threshold liability limits have been reduced.

COMSTAC member, Billie Reed, who is the executive director for the Virginia Commercial Space Flight authority, confirmed the information provided by Mr. Vinter and Ms. Sadler, by reporting that the maximum amount of coverage for the Virginia commercial spaceport has been reduced almost 50% at a rate approximately four times higher than it was in the past. COMSTAC alternate Elaine David asked about exclusions for liability as a result of terrorists' acts. Ms. Sadler responded that even with the introduction of specific terrorism exclusions, actual coverages for space-related activities would not be substantially changed.

Technology and Innovation Working Group (TIWG)

Bob Cowls, sales director--Americas, Delta Launch Services, Inc. for The Boeing Company, provided an update on the activities of the TIWG since the October 18, 2001

meeting. He acknowledged the 2002 GSO Market Forecast and indicated that the TIWG would be monitoring other issues that might influence market demand such as technology requirements on the commercial side and the NASA Space Launch Initiative (SLI). He also noted that the TIWG would examine other future areas and emerging markets such as space tourism.

Reusable Launch Vehicle Working Group (RLVWG)

Mike Kelly, chairman of Kelly Space & Technology (present via telephone conferencing), introduced Paul Birkeland, vice president, Kistler Aerospace, who provided the report for the RLVWG. Mr. Birkeland reported on the issues discussed by the RLVWG on Wednesday, May 22, including the issue of a new term to replace "reusable launch vehicle," reporting that the working group is leaning toward the term "space plane." He also reported that the RLVWG had delivered a list of ten issues to AST for future research and development. Finally, he reported on the RLVWG's discussion of an alternative risk assessment approach, indicating that the ultimate goal in this area is unrestricted flight corridors for RLVs and the major question is how to make the transition to that goal. He reported that one approach is to apply operational restrictions that can be lifted as confidence is gained in the systems and the technology. He noted that the expected casualty methodology currently in use has operational restrictions inextricably built into it and that unless the RLV industry has an alternative approach, it cannot achieve its goal. He reported that the RLVWG is examining a risk assessment methodology for licensing, that utilizes standard industry reliability analyses and, if necessary, operational restrictions with clear sunset conditions.

COMSTAC alternate, Chris DeMars, asked whether commercial aviation could meet the same restrictions for flight corridors as those applied to RLVs and if not why are the standards different. Mr. Birkeland replied that licensing of commercial airlines is based on hardware assessment for the safety of passengers and not overflight. He noted that AST is currently examining this critical issue

Launch Operations and Support Working Group (LOSWG)

The LOSWG report was presented by Darren Buck, Project Lead for Florida Operations, Strategic Planning and Business Development, United Space Alliance. Mr. Buck reported on the LOSWG meeting held on Wednesday, May 22 and introduced Mr. Paul Eckert, technology policy analyst in the Office of Space Commercialization, U.S. Department of Commerce and Lt. Col. Blaise Kordell, deputy chief, Space and Launch Ranges Division, Air Force Office of Space Operations and Integration. Mr. Eckert and Lt. Col. Kordell provided a briefing on the ***Commercial Range Users Memorandum of Agreement*** (MOA), signed by the FAA, the Department of Commerce, and the Air Force in February 2002.

Mr. Eckert noted that the MOA process began with the OSTP-led interagency effort which led to a report in February 2000, recommending consideration of commercial range users' requirements in Eastern and Western range modernization, adding that the Space Policy Coordinating Committee assumed responsibility in early 2001 and the MOA was signed in February 2002.

Lt. Col. Kordell noted that the Air Force operates in four environments which dictates the way the Air Force handles commercial requirements: 1) a statutory regime based on DOD Title 10; 2) the DOD programming, planning, and budgetary process; 3) the requirements and validation process at the command level, i.e., Air Force Space Command; and 4) the acquisition management process. He noted that only commercial requirements congruent with DOD's mission of protecting national security can be integrated into the Air Force planning process (i.e., either similar to existing Air Force plans or representing new mission-congruent options); unique commercial requirements cannot be funded by the Air Force; a competitive Air Force funding process means no guarantee of funding, but the priority is higher if both commercial users and the Air Force would benefit; and a timetable must mesh with the Air Force/DOD planning calendar.

Mr. Eckert described the MOA process and the timetable for collecting and processing industry commercial requirements, and reported that the group is considering a two-year MOA cycle, which will be consistent with the Air Force planning cycle. He noted that FAA and Commerce are examining spaceports and their requirements and the lessons learned from the Federal ranges will be applied to spaceports whenever it is appropriate to do so. He concluded by emphasizing the importance of the government/industry partnership which the MOA has created.

Mr. Buck concluded by discussing the process for developing the LOSWG report entitled ***Inaugural Review of Commercial Launch Requirements***. He listed the recommendations and advancements in the range requirements review including: the demonstration and certification of GPS metric tracking capabilities, space-based telecommunications capabilities, autonomous flight termination; additional downrange RADAR capability; and upgrades for command destruct receiver technology.

COMSTAC member Jim Pagliasotti commented that the MOA and the report represented an historical accomplishment and acknowledged the outstanding work of Mr. Buck, Mr. Eckert, and Col. Kordell.

After a call to vote on the report by Chairman Holder, the report was adopted by the full Committee.

New Business and Wrap Up

COMSTAC member Billie Reed recommended that COMSTAC work with AST to provide input on commercial space transportation issues for inclusion into the report currently being developed by the Aerospace Commission, headed by Robert Walker. Chairman Holder accepted this recommendation and asked the LOSWG to take the lead on that effort.

Since there was no additional new business, the meeting was adjourned at 12:59 p.m., subject to the call of the Chair.

Livingston L. Holder, Jr.

Livingston L. Holder, Jr., Chairman, COMSTAC

ATTENDEES

COMSTAC Members

Livingston Holder, COMSTAC Chairman, Andrews Space & Technology
Eleanor Aldrich, American Institute of Aeronautics and Astronautics
Alfred A. Boyd, SAIC
Robert Cowls, The Boeing Company
Steven Flajser, Loral Space and Communications, Ltd.
Louis Gomez, New Mexico Office of Space Commercialization
Michael Kelly, Kelly Space & Technology, Inc. (via telephone conferencing)
Alex Liang, The Aerospace Corporation
John Logsdon, George Washington University
James Pagliasotti, JMP Associates, Inc.
Billie Reed, Virginia Commercial Space Flight Center
Janet Sadler, Redholm Underwriting
John Vinter, International Space Brokers
Hamet Watt, OrderbyTV, Inc.
Charles Hall, American Airlines
Paul Birkeland, Kistler Aerospace (Alternate for Mike Kelly)
Darren Buck, United Space Alliance (Alternate for William Pickavance)
Elaine David, Lockheed Martin (Alternate for Mark Albrecht and Thomas Marsh)
Christopher DeMars, Orbital Sciences Corporation (Alternate for Mark Bitterman)